

Description

MULTIPURPOSE POWER POINT FOR VEHICULAR USE

BACKGROUND OF INVENTION

[0001] This application claims the benefit of U.S. Provisional Application No. 60/536,209, filed January 13, 2004.

[0002] Field of the Invention

[0003] The present invention relates to a power point for providing, in the context of a vehicle, electrical power, accessible to the driver or other passenger, for powering such devices as an ignitor plug or an accessory power plug supplying a device such as a telephone, a light, or other electrical or electronic devices.

[0004] Disclosure Information

[0005] Cigarette or cigar lighter sockets have been used for many years in vehicles, in conjunction with an ignitor plug which is inserted in the socket and heated. With the advent, however, of a veritable plethora of electrical and electronic

devices intended to be driven by the low voltage electrical systems of vehicles via the lighter socket, cigarette lighter sockets have assumed a dual role, with perhaps the more important part of the duality being the powering of various electronic devices. Accessory power plugs used with various electrical and electronic devices typically have a body made of plastic, with metallic center and side electrodes. The side electrodes are frequently made very robust, and, unfortunately, the use of such accessory power plugs sometimes deforms the detent mechanisms mounted within lighter sockets to a point at which the cigarette or cigar lighter will not be properly retained within the socket.

[0006] The present invention solves the problems with maintaining the structural integrity of detents used to retain an ignitor plug within a vehicular cigarette or cigar lighter, while nevertheless permitting the use of accessory power plugs having side terminals incorporated therein.

SUMMARY OF INVENTION

[0007] A multipurpose power point for use by, and accessible to, the occupants of a vehicle, includes a generally cylindrical terminal housing having an open end and a closed end, and a center terminal located within the terminal housing

at the closed end. The center terminal is adapted for making contact with a power consuming device inserted into the terminal housing. At least one detent is provided, with the detent having a first end attached to the terminal housing and a second end adapted for subjecting a power consuming device inserted into the terminal housing to both radially and axially directed forces. An overtravel preventer, attached to an outer housing portion of the power point, engages the detent and subjects the detent to a radially inwardly directed force sufficient to prevent the detent from deforming plastically in response to an opposing force placed upon the detent by a power consuming device. In this manner, the retention or detenting capability of the detent with respect to an ignitor plug will be properly maintained during the useful life of the vehicle.

[0008] According to one aspect of the present invention, an outer housing of the multipurpose power point is generally cylindrical and coaxial with the terminal housing. An overtravel preventer according to the present invention may comprise an integral formed rib extending axially along an inner portion of the outer housing such that the rib will contact one of the previously described detents, so as to

limit deflection of the detent in response to forces imposed upon the detent by the power consuming device. As an alternative, the overtravel preventer may include a simply supported, integral ribbon extending axially along, but radially separated from a detent, with the integral ribbon having a section profile which matches the section profile of the detent. As yet another alternative, the overtravel preventer may include an integral cantilevered ribbon extending axially along but radially separated from the detent.

[0009] According to another aspect of the present invention, the outer housing may include a generally cylindrical ring adapted for mounting a power point within a panel, such as an instrument or dash panel, with the overtravel preventer including an integral formed rib extending axially along an inner portion of the generally cylindrical ring such that the rib will contact a detent so as to limit deflection of the detent in response to forces imposed upon the detent by a power consuming device inserted to the generally cylindrical terminal housing.

[0010] An overtravel preventer according to the present invention may alternatively include an inwardly extending stop upset from the outer housing, with the stop being either

fully attached to the outer housing or partially separated from the outer housing. In any event, the overtravel preventer is structured so as to engage one or more detents formed in the generally cylindrical terminal housing and thereby subject the detent to a radially inwardly directed force sufficient to prevent the detent from deforming plastically in response to radially directed force imposed upon the detent by a combination terminal and retention contact mounted to the side of an accessory power plug.

[0011] The present inventive power point allows the powering of devices other than cigarette lighters, without impairing the function of the cigarette lighter itself.

[0012] Other advantages, as well as objects and features of the present invention, will become apparent to the reader of this specification.

BRIEF DESCRIPTION OF DRAWINGS

[0013] Figure 1 is a perspective view of a multipurpose power point according to the present invention showing an ignitor plug for use with the power point.

[0014] Figure 1A is a sectional view of the multipurpose power point of FIG. 1, taken along the line 1A-1A of Figure 1.

[0015] Figure 2 illustrates a prior art power point and a typical accessory power plug in use today.

[0016] Figure 3 illustrates a cut-away multipurpose power point according to the present invention having an accessory power plug inserted therein.

[0017] Figure 4 illustrates another embodiment of a mounting device for a power point according to the present invention.

[0018] Figures 5, 6, 7, 8 and 9 illustrate various overtravel preventers formed in an outer housing of a multipurpose power point according to the present invention.

[0019] Figure 10 illustrates an overtravel preventer attached directly to the terminal housing of a multipurpose power point according to the present invention.

DETAILED DESCRIPTION

[0020] As shown in FIG. 1, multipurpose power point 10 includes a generally cylindrical terminal housing 12 having an open end 12a and a closed end 12b. Center terminal 14, which is conventionally a positive terminal, and which is wired to the vehicle's electrical system in conventional fashion, is located within terminal housing 12. Center terminal 14 is available to engage either an ignitor plug, 32, or an accessory power plug, 36 (shown in FIG. 2 with a prior art terminal housing).

[0021] As shown in FIG. 2, accessory power plug 34 has at least

one side terminal and retention contact 36 extending from the body of the power plug. Center electrode 38 projects from an end of power plug 34. In many cases, contact 36 will cause unprotected detent or lance 22 to deform plastically, or colloquially, bend, radially outwardly to the point where ignitor plug 32 cannot be retained within generally cylindrical terminal housing 12. This problem is solved as shown in FIGS. 1 and 1A through the use of one or more ribs 42 which are integral with outer housing 40 and which extend axially along an inner portion of outer housing 40 such that rib 42 will contact latch portion 26 of detent 22, so as to prevent spring portion 24 of detent 22 from deforming plastically and thereby losing its ability to retain ignitor plug 32 within terminal housing 12. In essence, rib 42, which is a first embodiment according to present invention, subjects detent or lance 22 to a radially inwardly directed force sufficient to prevent the detent from deforming plastically in response to an opposing force placed upon the detent by a power consuming device, whether it be an ignitor plug 32 or more likely, an accessory power plug 34. Rib 42 may be linear or may be formed so as to approximate the section profile of detent 22.

[0022] FIG. 3 illustrates a preferred embodiment according to the present invention in which an overtravel preventer includes ribbon 44 which is simply supported by outer housing 40. Being simply supported, ribbon 44 is attached at each of its ends to outer housing 40, but is separated at its sides from outer housing 40. Ribbon 44 extends axially along, but radially separated from, lance or detent 22. Ribbon 44 has a section profile which approximates the section profile of detent 22. In this manner, ribbon 44 provides an optimum amount of support for detent or lance 22, so as to prevent plastic deformation of spring portion 24 of lance 22.

[0023] FIG. 5 illustrates a second ribbon type of overtravel preventer, 46, having a spring portion 46a and a detent portion 46b. The ribbon of FIG. 5 differs from that shown in FIG. 3 inasmuch as ribbon 46 is cantilevered from outer housing 40. In addition to spring portion 46a, ribbon 46 has a latch portion 46b.

[0024] FIG. 6 illustrates an embodiment in which stop 54 is upset from outer housing 40. FIG. 7 shows similar stop, except that the stop 56 of FIG. 7 is partially detached from outer housing 40. FIG. 8 illustrates a self-retaining insert which could, for example comprise a metallic or non metallic

rivet or other type of barbed fastener known to those skilled in the art and suggested by this disclosure.

[0025] FIG. 9 illustrates an overtravel preventer, 68, formed as a necked-down segment extending axially for a portion of outer housing 40.

[0026] FIG. 10 illustrates an embodiment of the present invention in which an overtravel preventer includes ribbon 64 which is welded directly to the outer cylindrical surface of terminal housing 12. This overtravel preventer may be employed without an outer housing.

[0027] FIG. 4 illustrates an embodiment in which a ring, 50, which is generally cylindrical, is adapted for attaching power point 10 to a panel of a vehicle, such as an instrument panel. The embodiment of FIG. 4 also has an inwardly upset axially extending rib, 52, which buttresses detent latch portion 56, so as to prevent plastic deformation of spring portion 54 in the previously described manner.

[0028] Although the present invention has been described in connection with particular embodiments thereof, it is to be understood that various modifications, alterations, and adaptations may be made by those skilled in the art without departing from the spirit and scope of the invention

set forth in the following claims.